

CLAIMS

WE CLAIM:

1. An inlet door assembly for reducing noise from an auxiliary power unit (APU) contained within an aircraft, the inlet assembly comprising:
 - a duct having an inlet port, an outlet port, and a flow passage therebetween through which APU noise propagates;
 - a door rotationally mounted on the duct and configured to selectively rotate between at least a first position, in which at least a portion of the door deflects the APU noise in a first direction, and a second position, in which at least a portion of the door deflects the APU noise in a second direction.
2. The inlet door assembly of claim 1, further comprising:
 - an actuator coupled to the door and configured to rotate the door to at least the first and second positions.
3. The inlet door assembly of claim 1, wherein the duct further includes a sidewall.
4. The inlet door assembly of claim 3, wherein the door includes a first side and the door first side is rotationally mounted in the inlet duct sidewall.
5. The inlet door assembly of claim 4, wherein the door further includes a second side and the door second side is rotationally mounted to the door first side.
6. The inlet door assembly of claim 3, wherein the door includes a midsection and the door is rotationally mounted in the inlet duct sidewall at the midsection.

7. The inlet door assembly of claim 2, wherein the door is further configured selectively rotate between at least a third position, in which at least a portion of the door is disposed within the inlet duct flow passage, and a fourth position, in which at least a portion of the door is not disposed within the inlet duct flow passage, and the actuator is further configured to rotate the door to the third and fourth positions.

8. The inlet door assembly of claim 2, further comprising:
a second door coupled to the actuator, wherein the actuator is configured to selectively rotate the second door between at least a first position, in which at least a portion of the door deflects the APU noise in a first direction, and a second position, in which at least a portion of the door deflects the APU noise in a second direction.

9. The inlet door assembly of claim 8, wherein the actuator is further configured to selectively rotate the second door between at least a third position, in which at least a portion of the second door is disposed within the inlet duct flow passage, and a fourth position, in which at least a portion of the second door is not disposed within the inlet duct flow passage.

10. The inlet door assembly of claim 8, further comprising:
a link coupled to the actuator, the link having first and second ends each coupled to the first and second doors.

11. The inlet door assembly in claim 10, further comprising:
first and second joining rods each having first and second ends, wherein the joining rod first ends are each coupled to the first and second doors, respectively, and the joining rod second ends are each coupled to the link first and second ends, respectively.

12. The inlet door assembly of claim 10, wherein the actuator is coupled to the first joining rod.
13. The inlet door assembly of claim 1 further comprising:
an arm having first and second ends, the arm first end rotationally mounted to the inlet duct sidewall, the arm second end coupled to the door.
14. The inlet door assembly of claim 13, wherein the actuator is coupled to the arm and configured to selectively raise and lower a portion of the arm into and out of the flow passage to thereby raise and lower the door.
15. The inlet door assembly of claim 14, further comprising:
a second arm having first and second ends, the second arm first end rotationally mounted to the inlet duct sidewall, the second arm second end coupled to the door.
16. The inlet door assembly of claim 15, further comprising:
a second actuator coupled to the second arm, the second actuator configured to selectively rotate the door atop the second arm second end.
17. A method for reducing APU noise from an APU located within an aircraft housing by an inlet door assembly during aircraft in-flight and ground operations, wherein the inlet door assembly comprises a duct having an inlet port, an outlet port, and a flow passage therebetween through which APU noise propagates, forward and aft doors each rotationally mounted on the duct and configured to selectively rotate between at least a first position, in which at least a portion of the door deflects APU noise in a first direction, and a second position, in which at least a portion of the door deflects the APU noise in a second direction, the method comprising:

pivoting the forward door out of the flow passage and pivoting the aft door into the flow passage, during aircraft ground operation;

pivoting the aft door out of the flow passage, while the forward door remains out of the flow passage; and

pivoting the forward door into the flow passage, while the aft door remains out of the flow passage, during aircraft in-flight operation.

18. The method of claim 17, further comprising:

pivoting the door forward and aft sides to a position level with the aircraft fuselage to thereby close the inlet duct.

19. A method for reducing APU noise from an APU located within an aircraft housing by an inlet door assembly during aircraft in-flight and ground operations, wherein the inlet door assembly comprises a duct having an inlet port, an outlet port, and a flow passage therebetween through which APU noise propagates, first and second doors each rotationally mounted on the duct and configured to selectively rotate between at least a first position, in which at least a portion of the door deflects APU noise in a first direction, and a second position, in which at least a portion of the door deflects the APU noise in a second direction, an actuator configured to rotate each door to at least the first and second positions, wherein the actuator further comprises a link having first and second ends, the first and second link ends coupled to the first and second doors respectively, the method comprising:

rotating the first door away from the inlet duct flow passage and rotating the second door into the inlet duct flow passage, during aircraft ground operation; and

rotating the first door into the inlet duct flow passage and rotating the second door away from the inlet duct flow passage, during aircraft in-flight operation.

20. A method for reducing APU noise from an APU located within an aircraft housing by an inlet door assembly during aircraft in-flight and ground operations, wherein the inlet door assembly comprises a duct having an inlet port, an outlet port, and a flow passage therebetween through which APU noise propagates, a door having a forward and an aft side, the door rotationally mounted on the duct and configured to selectively rotate between at least a first position, in which at least a portion of the door deflects APU noise in a first direction, and a second position, in which at least a portion of the door deflects the APU noise in a second direction, an actuator coupled to the door, the actuator further comprising an arm having first and second ends, the arm first end rotationally mounted to the duct, the arm second end configured to move into and out of the flow passage, the arm second end coupled to the door, wherein the actuator is configured to selectively raise and lower the door relative to the aircraft housing and rotate the door between at least the first and second positions, the method comprising:

- raising the arm relative to the aircraft fuselage to thereby raise the door and open the inlet duct;

- rotating the door forward side proximate the aircraft fuselage, during aircraft ground operation; and

- rotating the door aft side proximate the aircraft fuselage, during aircraft in-flight operation.